More Questions on Circular Dynamics

1. A commercial plane of mass 158212kg traveling at 320km/h flies in a horizontal circle in the air by tipping its wings at an angle. If the circle is 270m in diameter, at what angle did the plane dip its wings? [80o from horizontal]
2. A rollercoaster goes over a hill. At the peak of the hill, when entering values for m, g, v and R, Newton's second law becomes: (assume up is positive, and all values for m, g, v and R are positive)
3. FN + mg = mv2/R
4. FN - mg = -mv2/R
5. FN - mg = mv2/R
6. FN + mg = - mv2/R

[b]

1. A rollercoaster has a hill of radius 28.0m. A rider goes over the hill at a constant speed of 14.0m/s. What is the g-Force on the rider at the top of the hill? [0.286 gees]
2. If a rider in the above rollercoaster had a mass of 76.5kg, what would his weight and apparent weight be at the top of the hill? [215N, 750N]
3. A car goes over a speed bump of radius 2.4m at a constant speed of 30km/h. Find the apparent weight of a 50kg rider.

[940N downward - not possible, FN = 0]

1. A speed skater digs into a turn of radius 15m by leaning at an angle of 57o from the vertical. What is the skater's speed? [15m/s]